**OCR**
RECOGNISING ACHIEVEMENT

GCSE

**Biology A
Twenty First Century Science**

General Certificate of Secondary Education **J633**

# Mark Schemes for the Units

# January 2009

*J633/MS/R/09J*

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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## GCSE Twenty First Century Science - Biology A (J633)

## MARK SCHEMES FOR THE UNITS

# Guidance for Examiners

1.  Mark strictly to the mark scheme.

2.  Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.

3.  Each separate marking point is indicated by a (1) at the end of that marking point.

4.  Abbreviations, annotations and conventions used in the detailed Mark Scheme:

> ORA = or reverse argument
> NOT = point that is not given credit
> AW/owtte = alternative wording/or words to that effect: allow any expression that is clearly equivalent
> / = Alternative and acceptable answers for the same marking point
> point = point must be present to gain the mark
> (description) = description which need not be present to gain the mark

> E.g. mark scheme shows 'work done in lifting / (change in) gravitational potential energy'
> work done = 0 marks
> work done lifting = 1 mark
> change in potential energy = 0 marks
> gravitational potential energy = 1 mark

5.  If a candidate alters his/her response, examiners should accept the alteration.

6.  The list principle: if a list of responses greater than the number requested is given, you work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, i.e. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

7.  Marking method for tick boxes:
    If there is a set of boxes, some of which should be ticked and others left empty, then you need to judge the entire set of boxes.

    E.g. If a question requires candidates to identify a city in England, then in the boxes

| Edinburgh | |
|---|---|
| Manchester | |
| Paris | |
| Southampton | |

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out). For a two-mark question, the rationale would be:

> All boxes are indicated scores 0 marks.
> All boxes blank scores 0 marks.
> All four boxes correct scores 2 marks.
> Three boxes correct scores 1 mark.
> Two boxes correct scores 1 mark.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Edinburgh | | | ✔ | | | ✔ | ✔ | ✔ | ✔ | |
| Manchester | ✔ | ✗ | ✔ | ✔ | ✔ | | | | ✔ | |
| Paris | | | | ✔ | ✔ | | ✔ | ✔ | ✔ | |
| Southampton | ✔ | ✗ | | ✔ | | ✔ | ✔ | | ✔ | |
| Score: | 2 | 2 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | NR |

**1**

A221/01                           **Mark Scheme**                          January 2009

# A221/01 Modules B1, B2, B3 Foundation Tier

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| **1** | **a** | | nucleus (1) | 1 | if more than one word is circled then circle scores zero<br>**allow** any other clearly identified correct response e.g. shading in the box |
| | **b** | | ☐<br><br>carry instructions for a cell ☑ (1)<br><br>☐<br><br>code for making proteins ☑ (1)<br><br>☐ | 2 | if more than two boxes are ticked then each incorrect box loses one mark from the total for the question<br>the candidate cannot score less than zero |
| | **c** | | ☐<br><br>☐<br><br>☐<br><br>… of very long DNA molecules. ☑ (1)<br><br>… that make up chromosomes. ☑ (1) | 2 | if more than two boxes are ticked then each incorrect box loses one mark from the total for the question<br>the candidate cannot score less than zero |
| | | | **Total** | **5** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 2 | a | | Peter (1) | 1 | one mark for the correct answer<br>if more than one name is given then candidate scores zero. |
| | b | | Ranjit (1) | 1 | one mark for the correct answer<br>if more than one name is given then candidate scores zero. |
| | c | | Jane (1) | 1 | one mark for the correct answer<br>if more than one name is given then candidate scores zero. |
| | d | | Stella (1) | 1 | one mark for the correct answer<br>if more than one name is given then candidate scores zero. |
| | | | **Total** | **4** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 3 | a | |  | 2 | three lines correct = 2 marks<br>two lines correct = 1 mark<br>one line correct = 0 marks<br>if there are two or more lines from a part of the body, then no mark is scored for that part |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| **3** | **b** | | Body temperature is 37 °C ☑ (1) <br><br> The body contains food … ☑ (1) | 2 | if more than two boxes are ticked then each incorrect box loses one mark from the total for the question <br> the candidate cannot score less than zero |
| | **c** | | microorganisms damage cells ☑ (1) <br><br><br> microorganisms produce toxins ☑ (1) | 2 | if more than two boxes are ticked then each incorrect box loses one mark from the total for the question <br> the candidate cannot score less than zero |
| | | | **Total** | **6** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 4 | a | |  | 4 | one mark for each correct line<br>if more than four lines are drawn then each additional line loses one mark<br>the candidate cannot score less than zero |
| | b | i | D (1) | 1 | one mark for the correct answer.<br>if more than one letter is given then candidate scores zero<br>**accept** Cc |
| | | ii | E (1) and B (1) | 2 | one mark for each correct answer<br>if more than two letters are given then candidate loses one mark for each additional answer<br>the candidate cannot score less than zero<br>the two correct responses can be either way round<br>**accept** hh and CC |
| | | | **Total** | **7** | |

In the diagram for 4a, the left column boxes read: "difficulty breathing and digesting food", "high temperature and sweating", "bleeding gums and wounds that don't heal", "falling over, clumsiness and loss of memory". The middle column boxes read: "Huntington's disorder", "cystic fibrosis". The right column boxes read: "one dominant allele of single gene", "two recessive alleles of a single gene", "three recessive alleles of a single gene", "four dominant alleles of a single gene".

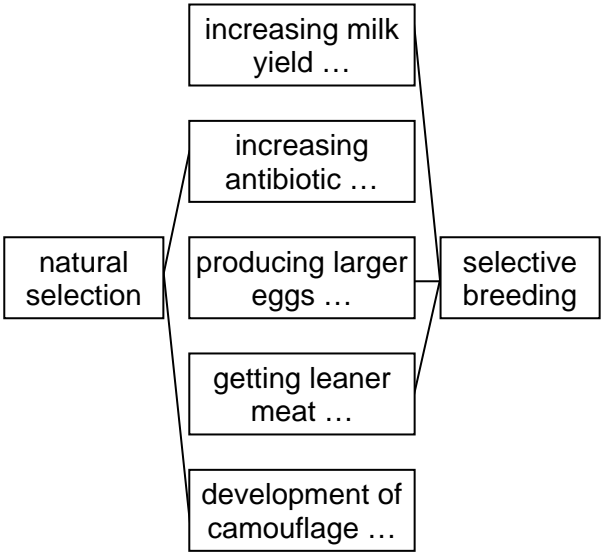| Question | Expected Answers | Marks | Rationale |
|---|---|---|---|
| 5 a | a safe form of the disease … ☑ (1) <br><br> ☐ <br><br> ☐ <br><br> ☐ | 1 | if more than one box is ticked then box scores zero <br> **allow** any other clearly identified correct response e.g. shading in the box |
| b | A (1) | 1 | if more than one answer given then = 0 marks |
| | **Total** | **2** | |

A221/01                                        **Mark Scheme**                                        January 2009

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 6 | a | i | Wendy (1) | 1 | |
| | | ii | Stella (1) | 1 | |
| | b | | ice cream sales increase in hot … ☐ ☑ (1) ☐ ☐ | 1 | if more than one box is ticked then box scores zero |
| | c | | ☐ ☐ John caught a cold when … ☑ (1) ☐ | 1 | if more than one box is ticked then box scores zero |
| | d | | ☐ ☐ ☐ playing too much football ☑ (1) | 1 | if more than one box is ticked then box scores zero |
| | | | **Total** | **5** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 7 | a | i | B (1) | 1 | if more than one letter is given then score = 0 marks **accept** correct written answer |
| | | ii | A (1) | 1 | if more than one letter is given then score = 0 marks **accept** correct written answer |
| | b | | increasing milk yield …<br><br>increasing antibiotic …<br><br>natural selection    producing larger eggs …    selective breeding<br><br>getting leaner meat …<br><br>development of camouflage … | 3 | five lines correct = 3 marks<br>four or three lines correct = 2 marks<br>two lines correct = 1 mark<br>one line correct = 0 marks<br><br>deduct one mark for each 'change' box with two lines |
| | c | | … Earth had been slightly different … ✓ (1)<br><br>☐<br><br>☐<br><br>☐ | 1 | if more than one box is ticked then box scores zero **allow** any other clearly identified correct response e.g. shading in the box |
| | | | **Total** | 6 | |

| Question | | | Expected Answers | | Marks | Rationale |
|---|---|---|---|---|---|---|
| 8 | a | | <table><tr><td>hormonal communication</td><td>nervous communication</td></tr><tr><td>B<br>C</td><td>A<br>D</td></tr></table> | | 2 | 4 correct = 2 marks<br>3 or 2 correct = 1 mark<br>1 correct = 0 marks |
| | b | | chemical | slow (1) | 2 | one mark for each correct **sentence**. |
| | | | electrical | fast (1) | | |
| | | | **Total** | | **4** | |

| Question | | | Expected Answers | | Marks | Rationale |
|---|---|---|---|---|---|---|
| 9 | a | | environment | ✓ (1) | 2 | if more than two boxes are ticked then each incorrect box loses one mark from the total for the question<br>the candidate cannot score less than zero |
| | | | other species | ✓ (1) | | |
| | | | | ☐ | | |
| | | | | ☐ | | |
| | b | | | ☐ | 1 | if more than one box is ticked then box scores zero<br>**allow** any other clearly identified correct response e.g. shading in the box |
| | | | | ☐ | | |
| | | | | ☐ | | |
| | | | destroying the rain forest | ✓ | | |
| | | | **Total** | | **3** | |
| | | | **Paper Total** | | **42** | |

# A221/02 Modules B1, B2, B3 Higher Tier

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 1 | a | | <table><tr><td>**human male**</td><td>**human female**</td></tr><tr><td>XY</td><td>XX</td></tr></table> | 2 | (1)      for each correct box<br>**allow** lower case xy and xx<br>                    yx and xx<br><br>                    x  and  x<br>                    y        x |
| | b | | Y (1) | 1 | **allow** the chromosome given above that is in the male box **not** the female box<br>SRY (Sex determining Region on the Y chromosome) = 1<br><br>Reject 23$^{rd}$ = 0      male = 0 |
| | c | | It causes the testes to develop (1)    [✓] | 1 | if more than one box ticked (0)<br>**allow** any other clearly defined correct response |
| | | | **Total** | 4 | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 2 | a | |  | 2 | four lines correct (2)<br>two or three lines correct (1)<br>one line correct (0)<br>additional lines lose (1) each<br>candidate cannot score less than 0 |
| | b | i | D (1) | 1 | if more than one letter is given the candidate scores 0<br>**allow** Cc |
| | | ii | E (1)<br>B (1) | 2 | either way round<br>**allow** hh and CC<br>if more than two letter are given then the candidate loses (1) for each additional answer<br>the candidate cannot score less than 0 |
| | | | **Total** | **5** | |

The diagram in question 2a shows boxes to be matched with lines:

Left column:
- Difficulty breathing and digesting food
- High temperature and sweating
- Bleeding gums and wounds that don't heal
- Falling over, clumsiness and loss of memory

Middle column:
- Huntingdon's disorder
- Cystic Fibrosis

Right column:
- One dominant allele of single gene
- Two recessive alleles of single gene
- Three recessive alleles of a single gene
- Four dominant alleles of a single gene

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 3 | a | | Peter (1) | 1 | if more than one name is given then the candidate scores (0) |
| | b | | Ranjit (1) | 1 | if more than one name is given then the candidate scores (0) |
| | c | | Jane (1) | 1 | if more than one name is given then the candidate scores (0) |
| | d | | Stella (1) | 1 | if more than one name is given then the candidate scores (0) |
| | | | **Total** | **4** | |

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| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| **4** | **a** | | the virus damages the immune system (1) ✓ <br><br><br><br> the virus has a high mutation rate (1) ✓ | 2 | if more than two boxes ticked then each incorrect box loses (1) <br> the candidate cannot score less than 0 |
| | **b** | | <br> the vaccine was very effective ✓ <br><br> a large percentage of the world's population was vaccinated against the disease ✓ | 1 | **allow** any other clearly defined response <br> if more than two boxes are ticked (0) <br> Both must be correct for 1 mark |
| | **c** | | <br> all school age children should receive the vaccine (1) ∨ <br><br> it has only been possible to vaccinate 81% of children (1) T | 2 | if more than one box is completed for each letter then box scores zero for that letter only. <br> The candidate cannot score less than zero. |
| | | | **Total** | **5** | |

13

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| **5** | **a** | | placebos are harmless chemicals that have no effect on the body (1) the patient does not know if they are taking a placebo (1) ✓ ✓ | 2 | if more than two boxes ticked then each incorrect box loses (1) the candidate cannot score less than 0 |
| | **b** | | it is morally wrong to give placebos when other more effective treatment are available (1) ✓ | 1 | if more than one box is ticked then each incorrect box loses (1) the candidate cannot score less than (0) |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 5 | c | | only an independent drug testing…(1) ✓<br><br>neither Ray or his doctor will know…(1) ✓ | 2 | if more than two boxes ticked then each incorrect box loses (1)<br>the candidate cannot score less than 0 |
| | d | | to obtain reliable data (1) ✓ | 1 | if more than one box is ticked then each incorrect box loses (1)<br>the candidate cannot score less than (0) |
| | | | **Total** | **6** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 6 | a | i | Wendy (1) | 1 | |
| | | ii | Stella (1) | 1 | |
| | b | | Ice cream sales increase in hot weather (1) ✓ | 1 | if more than one box is ticked then box scores 0 |
| | c | | John caught a cold when visiting Mary in hospital (1) ✓ | 1 | if more than one box is ticked then box scores 0 |
| | | | **Total** | **4** | |

A221/02                                    Mark Scheme                                    January 2009

| Question | Expected Answers | Marks | Rationale |
|---|---|---|---|
| 7 a | the number of sightings are increasin ✓ (1)<br><br>the harlequin ladybirds are spreading across the country (1) ✓ | 2 | if more than two boxes are ticked then each incorrect box loses (1) candidate cannot score less than 0<br><br>**IGNORE** answers in first / top box |
| b | the mutation of a non-poisonous gene ✓ to a poisonous one (1)<br>inheriting the gene from its parents (1) ✓<br><br>natural selection of the poisonous ✓ gene (1) | 3 | if more than three boxes are ticked then each incorrect box loses (1) the candidate cannot score less than 0 |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 7 | c | | There is not enough data currently available (1) ✓ <br><br> scientists do not know how other species will adapt (1) ✓ | 2 | if more than two boxes are ticked then each incorrect box loses (1) <br><br> candidate cannot score less than 0 |
| | | | **Total** | **7** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 8 | a | i | B (1) | 1 | if more than one response (0) <br> Accept correct written answer |
| | | ii | A (1) | 1 | if more than one response (0) <br> Accept correct written answer |
| | b | | if conditions on Earth had been different from what they actually were (1)  ✓ | 1 | if more than one box is ticked then box scores 0 |
| | | | **Total** | **3** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 9 | a | | C | B | E | A | D | 2 | C before B; B before E; E before A<br><br>3 correct = 2 marks<br>2 correct = 1 mark<br>1 correct = 0 marks |
| | b | | the nervous system is faster than the hormone system (1)   ✓<br><br><br>the nervous system uses electrical impulses (1)   ✓ | 2 | if more than two boxes are ticked then each incorrect box loses (1)<br>candidate cannot score less than 0 |
| | | | **Total** | **4** | |
| | | | **Paper Total** | **42** | |

# A222/01 Modules B4, B5, B6 Foundation Tier

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 1 | a | | D C B A | 2 | C before B (1)<br>B before A (1) |
| | b | | evaporates and cools the skin ✓ | 1 | more than one response (0)<br><br>**Accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | c | | increases (1)<br>water (1) | 2 | |
| | | | **Total** | **5** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 2 | a | | passive<br>high<br>low | 2 | 3 correct (2)<br>2 correct (1)<br>1 or 0 correct (0) |
| | b | | …water molecules ✓<br><br>…molecules across a partially permeable membrane ✓<br><br>…molecules from a dilute to a concentrated solution ✓ | 2 | 3 correct = 2 marks<br>2 correct = 1 mark<br>1 correct = 0 marks<br><br>Candidates lose 1 mark for each additional response.<br>Candidates cannot score less than zero<br><br>**Accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | c | | becomes higher (1) | 1 | more than one response (0) |
| | | | **Total** | **5** | |

**Mark Scheme**

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| **3** | **a** | | drinking<br>feeding<br>respiring | 2 | more than three responses **deduct** (1) for each extra response<br><br>3 correct (2)<br>2 correct (1)<br>1 or 0 correct (0)<br><br>**Accept** any other clear indication of correct response e.g. ticks, underlining etc. |
| | **b** | | amount of salt eaten (1)  ✓<br><br>drinking alcohol (1)  ✓<br><br><br>external temperature (1)  ✓ | 3 | more than three responses **deduct** (1) for each extra response<br><br><br>**Accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | | | **Total** | **5** | |

A222/01 **Mark Scheme** **January 2009**
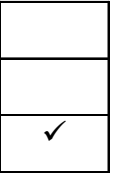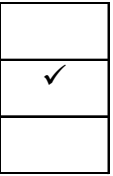
| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| **4** | **a** | **i** | mitosis (1) | 1 | more than one response (0) |
| | | **ii** | increases (1) | 1 | more than one response (0) |
| | **b** | **i** | …halved. ✓ | 1 | more than one response (0)<br><br>**Accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | | **ii** | zygote (1) | 1 | more than one response (0) |
| | | **iii** | 28 (1) | 1 | more than one response (0) |
| | | | **Total** | **5** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| **5** | **a** | **i** | cytoplasm (1) | 1 | more than one response (0)<br>**Accept** any other clear indication of correct response e.g. ticks, underlining etc. |
| | | **ii** | …stops (1) ✓ | 1 | more than one response (0)<br><br>**Accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | **b** | | four (1)<br>bases (1) | 2 | (1) each<br>**Accept** any other clear indication of correct response e.g. ticks, underlining etc.<br>more than one response for each set of boxes (0) |
| | | | **Total** | **4** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 6 | a | | The cells are already specialised (1)   ✓ | 1 | more than one response (0)<br><br>**Accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | b | | …some active and some inactive genes (1)   ✓ | 1 | more than one response (0)<br><br>**Accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | c | | zygote (1) | 1 | more than one response (0) |
| | d | | …have some cells which continue to divide by mitosis (1)   ✓ | 1 | more than one response (0)<br><br>**Accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | | | **Total** | 4 | |

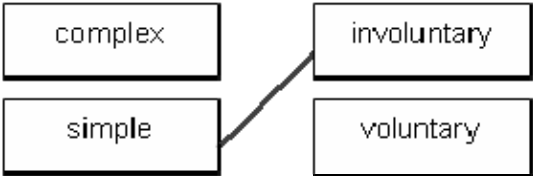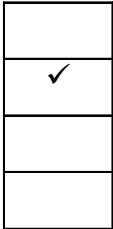| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 7 | a | i | peripheral nervous system (1) | 1 | more than one response (0) |
| | | ii | muscle cells (1) | 1 | more than one response (0) |
| | b | i | …receptors to the CNS (1) ✓ | 1 | more than one response (0) <br><br> **Accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | | ii | C <br> B <br> D | 2 | 3 correct (2) <br> 2 correct (1) <br> 1 or 0 correct (0) |
| | | | **Total** | **5** | |

A222/01 **Mark Scheme** January 2009

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| **8** | **a** | |  | 1 | look at the link as it leaves the bottom left-hand box and connects to the top right hand box<br><br>more than one response (0) |
| | **b** | **i** | new pathways form (1)  | 1 | more than one response (0)<br><br>**Accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | | **ii** | impulses (1)  | 1 | more than one response (0)<br><br>**Accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | **c** | | Bob (1)<br>Pnashe (1) | 2 | **allow** the two correct names in either order |
| | | | **Total** | **5** | |

A222/01                                    **Mark Scheme**                                    January 2009

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 9 | a | | …remember things (1) <br><br> …speak (1) | 2 | more than 2 responses, deduct (1) for each extra response <br><br> **Accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | b | | …apply an electrical charge to parts of the brain (1) <br><br> …look at images from an MRI scanner (1) | 2 | more than 2 responses, deduct (1) for each extra response <br><br> **Accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | | | **Total** | **4** | |

| | | | **Paper Total** | **42** | |

# A222/02 Modules B4, B5, B6 Higher Tier

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 1 | a | | drinking<br>feeding<br>respiring | 2 | more than three responses, **deduct** (1) for each extra response<br>**accept** any other clear indication of correct response e.g. ticks, underlining etc.<br>3 correct (2)   2 correct (1)   1 or 0 correct (0) |
| | b | | amount of salt eaten (1)     ✓<br>drinking alcohol (1)     ✓<br><br>external temperature (1)     ✓ | 3 | more than three responses **deduct** (1) for each extra response<br><br>**accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | c | | cerebral cortex     bladder<br><br>hypothalamus   ADH   brain<br><br>pituitary gland     kidney | 2 | correct line on left (1)<br>correct line on right (1)<br><br>more than one line on left or right side, 0 marks for that side<br><br>ignore crossed-out lines |
| | d | | Paul (1)<br>Megan (1) | 2 | **allow** names in either order |
| | | | **Total** | **9** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 2 | a | i | hypothalamus (1) | 1 | more than one response (0) <br><br> **accept** any other clear indication of correct response e.g. tick, underlining etc. |
| | | ii | …temperature receptors are stimulated. ✓ <br> …the skin becomes red. ✓ <br> …the sweat glands produce more sweat. ✓ | 2 | more than three responses **deduct** (1) for each extra response <br><br> 3 correct (2) <br> 2 correct (1) <br> 1 or 0 correct (0) <br><br> **accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | b | i | B D A C E | 2 | B before D <br> D before A <br> A before C <br><br> 3 correct (2) <br> 2 correct (1) <br> 1 or 0 correct (0) |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| **2** | **b** | **ii** | confusion ☑ <br><br> dizziness ☑ <br><br><br> hot, dry skin ☑ | 1 | 3 correct (1) <br><br> **accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | | | **Total** | **6** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| **3** | **a** | **i** | cytoplasm (1) | 1 | more than one response (0) <br> **accept** any other clear indication of correct response e.g. tick, underlining etc. |
| | | **ii** | …stops (1) ☑ | 1 | more than one response (0) <br><br> **accept** any other clear indication of correct response e.g. cross, shading, linking line etc. |
| | **b** | | four (1) <br> bases (1) | 2 | (1) each <br> more than one response for each set of boxes (0) <br> **accept** any other clear indication of correct response e.g. ticks, underlining etc. |
| | | | **Total** | **4** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| **4** | **a** | **i** | B<br>C<br><br>A | 1 | 3 correct (1)<br><br>more than one response in any box (0) |
| | | **ii** | Kev (1)<br>Jimmy (1) | 2 | **allow** names in either order |
| | **b** | | photosynthesis (1) | 1 | more than one response (0)<br><br>**accept** any other clear indication of correct response e.g. tick, underlining etc. |
| | | | **Total** | **4** | |

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| **5** | **a** | | zygote cell (1) | 1 | more than one response (0)<br>**accept** any other clear indication of correct response e.g. tick, underlining  etc. |
| | **b** | **i** | some inactivated genes are reactivated (1) ✓ | 1 | more than one response (0)<br><br>**accept** any other clear indication of correct response e.g. cross, shading, linking line etc. |
| | | **ii** | hormones (1) | 1 | more than one response (0)<br>**accept** any other clear indication of correct response e.g. tick, underlining etc. |
| | | | **Total** | **3** | |

A222/02 Mark Scheme January 2009

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| **6** | **a** | | …remember things (1)  ✓<br><br>…speak (1)  ✓ | 2 | more than 2 responses, deduct (1) for each extra response<br><br>**accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | **b** | | …apply an electrical charge to parts of the brain (1)  ✓<br><br>…look at images from an MRI scanner (1)  ✓ | 2 | more than 2 responses, deduct (1) for each extra response<br><br>**accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | | | **Total** | **4** | |

A222/02                       **Mark Scheme**                      **January 2009**

| Question | | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 7 | a | i | E C A D B | 3 | C before A (1)<br>A before D (1)<br>D before B (1) |
| | | ii | …the motor neuron (1) ✓ | 1 | more than one response (0)<br><br>**accept** any other clear indication of correct response e.g. cross, shading, linking line etc. |
| | b | | brain (1)<br>increase (1) | 2 | **accept** any other clear indication of correct response e.g. linking lines etc. |
| | | | **Total** | **6** | |

| | Question | | Expected Answers | Marks | Rationale |
|---|---|---|---|---|---|
| 8 | a | | ears (1)<br>cerebral cortex (1) | 2 | more than two responses deduct (1) for each additional response<br>**accept** any other clear indication of correct response e.g. ticks, underlining etc. |
| | b | | …by repeating the instructions    ✓<br><br>…by the pattern of left and right-hand turns    ✓ | 1 | 2 correct (1)<br><br>**accept** any other clear indication of correct response e.g. crosses, shading, linking lines etc. |
| | c | | …she knows that she turns left when she smells the sweet factory (1)    ✓ | 1 | more than one response (0)<br><br>**accept** any other clear indication of correct response e.g. cross, shading, linking line etc. |
| | d | | B<br>A<br>C | 2 | 3 correct (2)<br>2 correct (1)<br>1 or 0 correct (0) |
| | | | **Total** | **6** | |

| | | | **Paper Total** | **42** | |

# Grade Thresholds

**General Certificate of Secondary Education**
**Biology A (Specification Code J633)**
**January 2009 Examination Series**

**Unit Threshold Marks**

| Unit | | Maximum Mark | A* | A | B | C | D | E | F | G | U |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **A221/01** | Raw | 42 | N/A | N/A | N/A | 29 | 24 | 19 | 14 | 9 | 0 |
| | UMS | 34 | N/A | N/A | N/A | 30 | 25 | 20 | 15 | 10 | 0 |
| **A221/02** | Raw | 42 | 39 | 36 | 30 | 24 | 15 | 10 | N/A | N/A | 0 |
| | UMS | 50 | 45 | 40 | 35 | 30 | 25 | 20 | N/A | N/A | 0 |
| **A222/01** | Raw | 42 | N/A | N/A | N/A | 29 | 25 | 21 | 17 | 13 | 0 |
| | UMS | 34 | N/A | N/A | N/A | 30 | 25 | 20 | 15 | 10 | 0 |
| **A222/02** | Raw | 42 | 38 | 34 | 28 | 23 | 18 | 15 | N/A | N/A | 0 |
| | UMS | 50 | 45 | 40 | 35 | 30 | 25 | 20 | N/A | N/A | 0 |

**Specification Aggregation Results**

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

| | Maximum Mark | A* | A | B | C | D | E | F | G | U |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **J633** | 300 | 270 | 240 | 210 | 180 | 150 | 120 | 90 | 60 | 0 |

The cumulative percentage of candidates awarded each grade was as follows:

| | A* | A | B | C | D | E | F | G | U | Total No. of Cands |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **J633** | 9.6 | 34.6 | 75.0 | 96.2 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 52 |

**198 candidates were entered for aggregation this series.**

For a description of how UMS marks are calculated see:
http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

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